DOCUMENT RESUME

ED 185 443 CG 014 285

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TITLE Life Events, Mental Health Functioning and the Use of Health Care Services by the Elderly.
PUB DATE 27 Nov 79
NOTE 26p.; Paper presented at the Annual Scientific Meeting of the Gerontological Society (32nd, Washington, DC, November 25-29, 1979).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Behavior Patterns; *Health Services; *Life Style; Mental Disorders; *Mental Health; *Older Adults; *Physical Health; Quality of Life; Questionnaires; Research Projects; Risk
IDENTIFIERS *Schedule of Recent Events

ABSTRACT

The association of life events and mental health impairment in a community population of older adults (N=986) was investigated. Data, collected in 1972 and analyzed during 1979, examined the relationship between the two variables while controlling for age, sex, race, social resources (a measure of social support), economic resources, and physical health. Subjects completed a questionnaire which included a modified form of the Duke-OARS Multidimensional Functional Assessment Questionnaire and an abbreviated version of the Holmes and Rahe Schedule of Recent Events. Findings indicated that increased life events were associated with health seeking behavior even when physical and mental health functioning were controlled. The associations between increased life events and both mental health functioning and health seeking behavior were small, suggesting that life events, as measured by the modified Schedule of Recent Events, were not important risk factors for elderly living in the community. (Author)

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ED185443

LIFE EVENTS, MENTAL HEALTH FUNCTIONING AND THE USE OF HEALTH CARE SERVICES BY THE ELDERLY

Running Head and Shorter Title:
LIFE EVENTS, MENTAL HEALTH AND THE ELDERLY

Key Words:
Life events, mental health, social support, health care services, elderly

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Approximate number of words in text 3,080 with eight tables.

Paper read at the 32nd Annual Scientific Meeting of the Gerontological Society, Washington, D.C., November 27, 1979.

CG014285

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LIFE EVENTS, MENTAL HEALTH FUNCTIONING AND THE USE OF HEALTH CARE SERVICES BY THE ELDERLY

Introduction

The association of social stress and mental health impairment has been a topic of interest to researchers for many years.[1,2,3] Though much recent research has been directed toward the elucidation of genetic and biological predisposing factors to mental illness, the complementary role of the social environment, especially as a precipitating factor, has not been neglected in research. Social factors as precipitants of mental health impairment in the elderly have been considered especially significant because: (1) certain medical illnesses appear to have less genetic "loading" in late life;[4,5] (2) the elderly may encounter more social stress than individuals at other stages of the life cycle,[6] such as loss of loved ones or change in roles and responsibilities; and (3) older persons are more susceptible to the deleterious effects of social stress.[7,8]

The measurement of social stress has been the topic of many scientific papers since the development of the Schedule of Recent Events by Holmes and Rahe in 1967.[9] They developed a simple and easily administered scale which quantified change in the lives of individuals and therefore operationalized the measurement of social stress. Many researchers have looked at the relationship between life events and mental health functioning.[10,11,12,13,14] Most of these studies have shown an increased risk for developing a mental health impairment when cumulative life events are above a critical value.

The widespread use of the Schedule of Recent Events has precipitated a number of critical articles on life events research. Rabkin and Struening have pointed out the major problems in life events studies.[15] The quality of data rising from the Schedule of Recent Events could be improved by: (1) using random sampling in a community population to distinguish between illness and care seeking behavior; (2) selecting better measures of the outcome variable

with proven reliability and validity; (3) controlling for the confounding effects of other variables (examples of factors known to effect the prevalence of mental health impairment in the elderly include age, physical health, economic resources, and social support);[3,17,18,19,20] and (4) using correlation and multivariant methods as opposed to simple t tests coupled with estimates of relative risk.[14]

Psychiatric epidemiology has suffered through the years because of the limitations in the many and varied concepts and constructs of mental illness. Therefore psychiatric epidemiologists have frequently turned to operational definitions of psychiatric morbidity and have therefore measured functional capacity.[21] Examples are the Stirling County Study[17] and the Midtown Manhattan Study.[1] Impairment and limitation in function is usually easier to measure than the presence or absence of a specific psychiatric disorder. Impairment of function continues to be a good measure of the burden that psychiatric disorders place on the health care delivery system and has often been used to predict the need for specific services.[22]

The association of life events and mental health impairment in a community population of older persons is studied in this paper. Data from this community survey allows for the testing of the association between these two variables while controlling for age, sex, race, social resources (a measure of social support), economic resources and physical health. A stratified analysis and binary linear regression analysis--a multivariant approach, are used to describe this data and to obtain both crude and adjusted estimates of relative risk. In addition, the association of life events with a variety of health related behaviors, controlling for physical or mental health impairment when appropriate, is studied.

Methods

A stratified random 1-in-10 sample of the residents of Durham County 65 years of age and older was drawn for an epidemiologic survey in early 1972; the OARS-Durham Survey.[22] There was an 85% response rate (n=997) by the original sample to an interviewer administered questionnaire given in the homes of the subjects. Individuals residing in any type of institution (hospital, psychiatric hospital, nursing home, etc.) were not included in this sample. Demographic characteristics of the sample are presented in Table 1. The survey assessed individual functioning along five parameters: social resources, economic resources, mental health, physical health and self-care capacity or activities of daily living. The survey instrument was a modified form of the Duke-OARS Multidimensional Functional Assessment Questionnaire that is presently being used in a number of community and institutional surveys.[22] To assess functioning along each parameter above, factual information, observational data and subjective perceptions of the individuals interviewed were collected. The items and scales used in this survey instrument were either devised originally for this survey or abstracted from the existing literature on functional assessment. The dependent or outcome variable in this study is mental health function. A series of items consisting of the SPMSQ (for the assessment of organicity),[23] Kincannon's mini-mult[24] (a short form of the MMPI), eight items assessing life satisfaction, two items assessing previous use of inpatient and outpatient psychiatric services and two items assessing subjective evaluation of mental health status make up the mental health functioning section of the questionnaire.

A primary goal of the OARS Project was to reduce data into manageable units for health care planning. If functional status in each of the five

dimensions could be considered simultaneously then functional "profiles"--namely the functional rating in each area for a given subject--could be matched with service utilization. The initial step was to translate data reliably from the multiple questions regarding each dimension into five summary measures on six-point scales. The scale for mental health functioning is reproduced in Table 2. Since 7,776 (6^5) possible combinations of functional status were possible from even this reduction, the research team further reduced the data into a manageable scheme which dichotomized the six-point scale as unimpaired (1-3) and impaired (4-6). Therefore 32 (2^5) profiles of impairment-unimpairment on each of the five dimensions could be developed for the sample. This approach to data reduction enabled this investigation to identify a series of individuals roughly equivalent to a "case" of mental health impairment. Then the relative risk of being assessed as a case could be calculated using a series of hypothesized risk factors.

Mental health functioning has been proven to be both a reliable and valid measure.

Ratings on each dimension is made by the interviewer following administration of the questionnaire. Inter-rater agreement on ratings of the five dimensions (ten raters rating 8 questionnaires in common) were social resources=.73, economic resources=.69, mental health=.68, physical health=.83 and ADL=.93 respectively. Eighty-two persons who were assessed by the OARS Questionnaire were rated independently by a psychiatrist and then blindly rated on the six-point scale. The Spearman rank order correlation was .62 ($p < .001$). This correlation is substantially higher than the

agreement obtained in many validity studies of psychiatric rating scales.

An abbreviated version of the Holmes and Rahe Schedule of Recent Events was included in the questionnaire[9] (see Table 3). Sixteen of the 44 life events were included, the selection of these events based on the likelihood of their occurrence in an elderly community based population, excluding such events as trouble with in-laws, change in schools, etc. Subjects were asked whether they had experienced these events during the 12 months prior to the survey. The events were given numerical weights ranging from 15 to 100 based on the weighing scheme proposed by Holmes and Rahe.[25] Of the 17 events in the Schedule of Recent Events receiving the heaviest weighing, 12 were included in this survey. The cumulative score obtained by an individual is designated the life change units (LCU) for that individual during the previous 12 months. Accumulation of 150 or more LCU's is considered a risk factor for the development of both physical and psychiatric illness.[9] As is readily apparent, the selection of events and the simple question of assessing whether or not an event has occurred significantly alters the approach to assessment and weighing taken by Holmes and Rahe. Yet the alteration consistently underestimates the accumulation of life events with no potential for overestimation; ie., the sensitivity of the instrument has been decreased without altering the specificity. if the original Schedule of Recent Events is used as a standard. If we assume that the "misclassification" is non-differential (ie., that it is the same for the MH impaired and the MH non-impaired), the calculated $\hat{RR}$ will consistently overestimate, by a small amount, the $\hat{RR}$ if the entire Schedule of Recent Events is administered. As can be seen in Table 4, 10% of the subjects in this study had LCU's ≥ 150. In one previous community survey,

Balter, et. al[12] report 15% of a community population aged 60-74 (n=550) to have LCU's $\geq$150. They found 13% of males (same as our figures) and 17% of the females (compared to 8% in our study) to have LCU's $\geq$150. Since accumulated LCU's decrease with increased age in this study, and since women between the age of 60 and 64 may be more susceptible to experiencing stressful life events, such as changing financial status, retirement of a spouse, etc., the estimate of accumulated life events in this study should not significantly underestimate LCU's as assessed by the Schedule of Recent Events.

A second part of the OARS Multidimensional Functional Assessment Questionnaire assessed information about a variety of generic services which aging and/or impaired individuals might require. Information was systematically obtained regarding services that subjects were currently receiving and also those services that were perceived to be needed. Subjects were asked about their need and use of 24 such services, including counselling, the use of psychotropic medications and medical care. In addition, information was obtained concerning the use of health care facilities and personnel during the previous year.

The relative risk for mental health impairment for individuals with life change units greater than or equal to 150 was calculated for this population using the methods outlined by MacMahon and Pugh.[26] The data was then stratified by age, sex, race, social resources, physical health functioning and economic resources. Relative risk for mental health impairment given life change units greater than 150 was calculated by the use of binary regression and controlling for physical health functioning,

economic resources, social resources and age.[27] Stratified analysis of the association of health related behaviors with life change units was then formed. Physical health impairment and mental health impairment were used as control variables when appropriate. The Statistical Package for the Social Sciences was used for each of the above analyses.[28]

Results

The estimated relative risk of mental health dysfunction for life change units ≥ 150 is presented in Table 5. A crude relative risk of 2.14 generally holds when the group is stratified for race and physical health. The relative risk is definitely confounded by age, sex, social resources and economic resources. The sample was simultaneously stratified for age, sex, social resources and economic resources, not shown in the table. This analysis demonstrated a definite trend toward positive relative risks, but many of the cells were so small that accurate estimates or further statistical tests were not possible. Though it appears that adequate social resources and adequate economic resources create a greater risk for mental health impairment, the small number of subjects who had LCU's >150 coupled with impaired social resources was 11 and the number who had LCU's >15 coupled with impaired economic resources was 20. The X^2_{MH} was non-significant in both cases, suggesting a statistical artifact. Because of the variation in some cells toward a relative risk of less than 1 (almost always groupings with very small cells) an overall risk and test of significance using a Mantel Haenzel chi square could not be performed.

Table 6 shows the correlation between the independent variable--life change units, and the dependent--mental health functioning, as well as correlations between significant control variables. The correlations

between the parameters of functioning; mental health, physical health, social resources and economic resources, are quite high when compared with the correlation between these variables and life change units. Therefore any regression procedure that controls for the other parameters of functioning would not be expected to demonstrate that life change units account for a high percentage of the variance. In Table 7, the results of the binary linear regression analysis are presented. The F statistic for LCU's is significant at the .01 level, but R^2 is less than .2. Therefore, as expected, LCU's do not explain an appreciable degree of the variance in mental health functioning. The estimate of relative risk using the regression model for developing mental health dysfunction given life change units greater than or equal to 150 is 1.73.

A stratified analysis of health related behaviors by life change units is presented in Table 7. Though the chi square values vary from .14 to 31.7, phi, which assesses the strength of the association, varies within a normal range. Many of the health related behaviors are significantly related to LCU's $\geq$150 at the .01 level but, the strength of the association is generally small. Again, LCU's explain only a fraction of the variance in these health related behaviors. Differences demonstrated when controlling for physical health or mental health are small and the large differences in chi square tests are more likely to be associated with the size of the strata than actual differences.

Discussion

A stratified random sample of elderly individuals (65 and older) were surveyed in a community based epidemiologic study. Those individuals with a life events score greater than or equal to 150 had

an increase risk for mental health dysfunction, both on crude analysis (relative risk=2.14) and using a binary regression model (relative risk=1.73). Though the risk is small, it is statistically significant. Strengths of this study include the use of a stratified random sample, a reasonably good identification (both reliable and valid) of mental health impairment, control for potential confounders and complementary use of X^2 and multivariant methods of analysis.

Other methodologic problems, however, persist. First, the study was retrospective in that life events were surveyed at the time mental health impairment was determined. Jenkins, et al. have pointed out that poor memory for life events and the contamination of memory secondary to illness are the most important disadvantages in the retrospective method.[29] In order to substantiate a causal relationship between life events and mental health impairment in the elderly, a prospective design would be necessary.

A second problem is the weighing of life events. Weights used in this study were derived from the Social Readjustment Rating Scale by Holmes and Rahe.[25] These weights were determined from studies of the general population and may not apply to the elderly. A number of researchers have pointed out that life events take on a different significance for older persons than for individuals at an earlier stage of the life cycle.[30,31] Neugarten has emphasized the importance of events occurring "off time" for older persons. For example, retirement, loss of income or even the death of a spouse may be tolerated quite well by an older person who expects these life events to occur and therefore is psychologically prepared for their

occurrence. When an event occurs "off time," such as the premature death of a loved one, these events are less easily tolerated.

Potential for bias in the measure of the independent variable, LCU's, has been already discussed in the methods section. The small but significant association between LCU's and mental health impairment would be weakened even further if the scale of life events used in this study significantly underestimates LCU's as measured by the Social Readjustment Rating Scale. Yet is is doubtful if the accumulated life events measured in this study vary markedly from those measured by the Social Readjustment Rating Scale.

The stratified analysis reveals some interesting results. The increased risk for mental health impairment in the young-old (age 65-74) coincides with the decreased subjective significance of these events with increasing age.[32] An increased risk in males suggests that males may be less capable of coping with stressful life events, such as the death of a spouse. Clinical experience would verify this finding. The small increase in risk for whites as opposed to non-whites coupled with the increased experience of stressful life events by non-whites suggests that non-whites may be more adaptive to stressful life events, possibly because of their increased expectation. The variation noted above relative to social resources and economic resources can best be explained as a statistical artifact secondary to the small number of individuals in these cells. Overall, the relationship of stressful life events and mental health impairment is markedly confounded by this series of control variables.

The significance of stressful life events as causative factors of mental health dysfunction, even though significant, may be quite small.

Mental health dysfunction is undoubtedly caused by a number of factors which interact in late life. Multiple factors therefore contribute to the "web of causation." The role of epidemiologic research is to tease out the various contributing factors and demonstrate the strength of their contribution.[26] Most older people who experience stressful life events do not manifest mental health impairment. The adaptive capacity of these individuals is quite good. In fact, the advantage of a lifetime of experience coupled with the expectation of certain changes in late life may place most older people at an advantage in adapting to "the stress of life."[33]

There is a small but definite relationship between life events and health related behavior. The demonstration of the relationship between life events and desire to see a trained counsellor, desire for and use of psychotropic medications, days in bed, doctors' visits and number of hospitalizations during the past year confirms the previous suggestions that increased life events are related to health care seeking behavior.[21] Again, however, life events explain only a small percentage of the variance.

Life events, in this study of an elderly population in the community are associated with mental health impairment and health seeking behavior. The association, however, is not strong, with a relative risk for mental health impairment, given increased life events approximating a value of 2. Though definite conclusions cannot be drawn from prevalence data, it is doubtful that life events, as measured and weighed on the Schedule of Recent Events, are important risk factors for the development of mental health impairment when physical health and social support are controlled.

TABLE 1

Demographic Characteristics of the Sample
(n=986)

	% of Distribution
Age	
65-74	68
75+	32
Sex	
Male	37
Female	63
Race	
White	66
Non-white	34
Marital Status	
Married	44
Other (single, widowed, divorced, separated)	56

TABLE 2

Mental Health Rating Scale

1. Outstanding psychological health. Intellectually alert, vigorous, and active, with personality resources adequate to function well in most environments.

2. No gross psychological impairments observed, no psychiatric symptoms. Intellectual resources, emotional and behavioral controls and social competence are adequate.

3. Mildly symptomatic or mildly psychologically impaired. May function poorly in some areas of his life but can cope adequately with most everyday situations.

4. Moderately symptomatic or psychologically impaired. Has difficulty coping in one major or several smaller areas of his daily life or reacts adversely to minor stresses. May function well in some areas but shows definite signs of psychological distress or intellectual impairment in other areas.

5. Severely psychologically impaired. Psychological distress or intellectual impairment either so severe or so constant as to interfere regularly with routine interpersonal of intrapersonal interactions.

6. Grossly psychotic or severely demented to the point of requiring either intermittent or constant supervision because of aberrant or potentially harmful behavior.

TABLE 3

Life Events Assessed

Life Event	Numerical Weight
Death of spouse	100
Personal injury or illness	53
Fired at work	47
Death of a close family member	63
Marital separation	65
Death of a close friend	37
Change in health of a family member	44
Divorce	73
Change in number of arguments with spouse	35
Change in financial state	38
Change in where you live	20
Sex difficulties	39
Retirement	45
Spouse begins or stops work	26
Change in living conditions	25
Marriage or remarriage	50

TABLE 4

Percentage of Sample with Impaired Mental Health and Life Change Units (LCU) $\geq$ 150 Stratified by Demographic Factors

	Percentage with MH Impairment	Percentage with LCU $\geq$ 150
Total	13	10
Age 65-74	10	10
Age 75+	18	10
Male	14	13
Female	12	8
White	10	8
Non-white	17	13

TABLE 5

Estimated Relative Risks of Mental Health Impairment by Life Change Units (LCU) Controlling for the Effects of a Variety of Factors (n=986)

Variable	% Distribution	Estimated Relative Risk by LCU ≥ 150	X^2 MH
Total		2.14	13.04**
Age			
65-74	68	2.65	12.55**
75+	32	1.51	1.44
Sex			
Female	62	1.51	1.40
Male	38	2.71	13.54**
Race			
White	66	2.13	5.67*
Non-white	34	1.89	5.17*
Social Resources			
Adequate Social Resources	91	2.32	12.20**
Impaired Social Resources	9	1.38	.655
Physical Health			
Adequate Physical Health	74	1.86	2.16
Impaired Physical Health	26	1.74	6.34*
Economic Resources			
Adequate Economic Resources	86	2.31	9.49**
Impaired Economic Resources	14	1.18	.002

$p < .05$
$p < .01$

TABLE 6

Correlations Among the Four Dimensions

	ER	MH	PH	LCU	Age
Social Resources (SR)	.31	.42	.25	.03	.05
Economic Resources (ER)		.42	.33	.07	.00
Mental Health (MH)			.55	.10	.07
Physical Health (PH)				.08	.15
LCU					-.01

TABLE 7

Results of Binary Regression; Dependent Variable is Mental Health Functioning

Variable	B	Beta	Standard Error B	F
Physical Health Functioning	.235	.311	.023	108.99*
Economic Resources	.146	.155	.028	27.36*
Social Resources	.546	.132	.034	20.24*
Age	.019	.012	.001	.16
Life Change Units	.086	.076	.033	6.90**

*p <.001
**p< .01

$\hat{RR}$=1.73
$CI_{(95\%)}$ (1.15, 2.60)

TABLE 8

Stratified Analysis of Health Related Behaviors
By Life Change Units (n=986)

	x^{2a}	ϕ^{b}
Need to discuss with trained counsellor	15.32**	.129
+mental health impairment	4.60	.226
-mental health impairment	17.53 *	.145
Need nerve medicine	8.22**	.094
+mental health impairment	2.07	.15
-mental health impairment	9.89**	.109
Have prescription for nerves	12.56**	.116
+mental health impairment	.14	.039
-mental health impairment	11.72**	.118
Days in the hospital	3.55	
Days in bed	2[illegible].55**	.161
+physical health impairment	5.23*	.144
-physical health impairment	31.66**	.207
Doctor visits during past year	22.96**	.152
+physical health impairment	2.16	.092
-physical health impairment	19.95**	.164
Number of hospitalizations, medical	18.25**	.136
+physical health impairment	3.67	.122
-physical health impairment	16.11**	.148
Perception of poor health	5.63*	
Perception of need for medical treatment	3.54	

*=Significant at .05
**=Significant at .01
$a_{X}2$ is an appropriate statistic for the significance of association.
b_{ϕ} is an appropriate statistic for the strength of association.

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